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ABSTRACT:
PURPOSE: To prevent the overheating of an engine under a disadvantageous cooling condition where travel air cannot be utilized by providing a means for stopping the engine or reducing the load of the engine when the temperature detected by a temperature state detecting means has risen exceeding the specified value.

CONSTITUTION: An engine 1 in operation is operated at a fixed speed by a governor, and an engine control device 4 controls the start and stop of the engine 1 according to the water temperature detected by a water temperature

detector 5 and the charged state of a battery 7 detected by a charged state
detecting device 6. The engine 1 is started when the water temperature is
95°C or lower and the charged quantity is lowered to about 40% or less of
the full- charged quantity, for instance, and the operation of the engine 1 is
stopped when the charged quantity exceeds about 80%. In the case of the water
temperature being approximately 95°C to 110°C, the engine 1 is started
when the charged quantity is lowered to about 20% or less, and the operation of
the engine 1 is stopped when the charged quantity exceeds about 40%. In the
case of the water temperature being about 110°C or higher, the engine 1 is
not operated.

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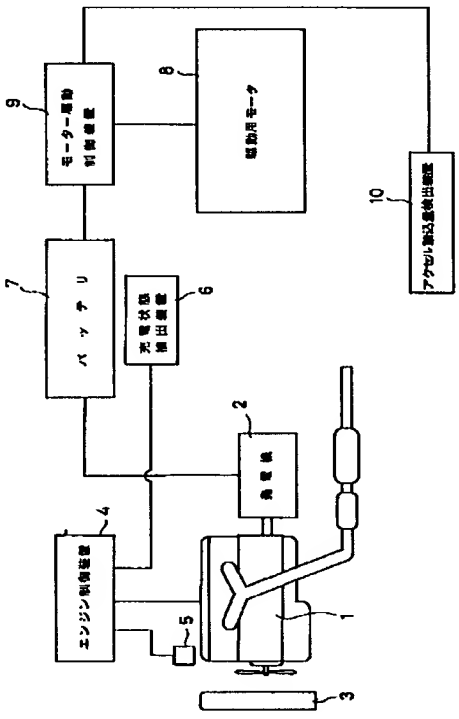
(54)【発明の名称】　ハイブリッド自動車

(57)【要約】
【目的】　オーバーヒートの防止機能を備える。
【構成】　エンジン１の温度状態を検出する手段５と、温度状態検出手段５の検出した温度が所定値を越えて上昇した時にエンジン１を停止するかまたはエンジン１の負荷を軽減する手段４を備える。



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【特許請求の範囲】

【請求項1】　走行動力源として蓄電池から供給される電流に駆動されるモータとエンジンとを備えるとともに、このエンジンの運転により発電機を駆動して前記蓄電池に充電する構造を備えたハイブリッド自動車において、エンジンの温度状態を検出する手段と、温度状態検出手段の検出した温度が所定値を越えて上昇した時にエンジンを停止するかまたはエンジンの負荷を軽減する手段とを備えたことを特徴とするハイブリッド自動車

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、走行動力源としてモータとエンジンとを備えたハイブリッド自動車の動力制御手段に関する。

【0002】

【従来の技術】自動車の排気ガス中に含まれるＮＯｘなどの有害成分の低減や省エネルギーの観点から、走行動力源にモータとエンジンを併用するハイブリッド自動車が近年注目されているこれは、エンジン出力が走行に必要な出力を上回る時に、余剰出力で発電機を駆動して蓄電池に充電する一方、加速時など要求される出力に対してエンジン出力が不足する時は蓄電池の電力でモータを運転し、その出力でエンジン出力の不足を補うものである（自動車工学全書　8「電気自動車、新形原動機」Ｐ69～72、昭和55年10月15日　山海堂発行）。

【0003】

【発明の課題】このようなハイブリッド自動車においては、停車中も充電のためにエンジンが定格運転を行うように構成されている。しかしながら、停車中は走行風によるエンジンの冷却を行うことができないために、エンジンの運転条件によってはエンジンがオーバーヒートしやすいという問題があった。

【0004】本発明は、上記問題点を解決すべくなされたもので、ハイブリッド自動車にオーバーヒートの防止機能を備えることを目的とする。

【0005】

【課題を達成するための手段】本発明は、走行動力源として蓄電池から供給される電流に駆動されるモータとエンジンとを備えるとともに、このエンジンの運転により発電機を駆動して前記蓄電池に充電する構造を備えたハイブリッド自動車において、エンジンの温度状態を検出する手段と、温度状態検出手段の検出した温度が所定値を越えて上昇した時にエンジンを停止するかまたはエンジンの負荷を軽減する手段とを備えている。

【0006】

【作用】温度が所定値を越えて上昇すると、エンジンの運転を停止し、あるいは発電機の発電を停止してエンジンの負荷を軽減することにより、エンジンがオーバーヒート状態になるのを防止する。

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【0007】

【実施例】図1～図6に本発明の実施例を示す。

【0008】図1はハイブリッド自動車の動力機構の構成を示し、1はラジエータ3を備えた冷却液循環システムのもとで運転される水冷式エンジンである。エンジン1には発電機2が結合し、この発電機2にバッテリ7が接続される。

【0009】エンジン1の運転はエンジン制御装置4により制御される。このエンジン制御装置4には温度状態検出手段としてラジエータ3の水温を検出する水温検出器5が接続され、またバッテリ7の充電状態を検出する充電状態検出器6が接続される。水温検出器5は例えばサーミスタで構成され、充電状態検出器6は例えばバッテリ7に充填されたバッテリ液の比重計で構成される。

【0010】運転中のエンジン1は図示されないガバナにより一定回転で運転され、エンジン制御装置4は水温検出器5の検出する水温と、充電状態検出装置6が検出するバッテリ7の充電状態に応じてエンジン1の始動と停止を制御する。

【0011】すなわち、例えば水温が95℃以下で、かつ充電量が例えばフル充電量の40％以下に低下した時にエンジン1を始動し、充電量が80％を上回るとエンジン1の運転を停止する。

【0012】水温が95℃以上110℃以下の場合は、充電量が20％以下に低下した時にエンジン1を始動し、40％を上回るとエンジン1の運転を停止する。

【0013】また、水温が110℃以上ではエンジン1の運転を行わない。

【0014】一方、バッテリ7の出力電流はモータ制御装置9を介してモータ8に供給される。モータ制御装置9にはアクセル踏込量検出機構10が接続され、モータ制御装置9はアクセル踏込量検出機構10の検出したアクセル踏込量が一定以上に達するとモータ8の運転を行う。

【0015】なお、モータ8は図示されない減速機を介して車輪に結合し、エンジン1と協働して車輪を回転駆動する。

【0016】次に作用を説明する。

【0017】エンジン制御装置4によるエンジン1の制御は図2に示すフローチャートに従って行われる。

【0018】すなわち、まず水温検出器5の出力から水温が95℃以下であるかどうかを判定し（S1）、95℃以下の場合はエンジン1の運転中であれば（S2）、バッテリ7の充電量が80％以上の場合はエンジン1の運転の停止し（S3，S9）、充電量が80％に満たない場合はエンジン1の運転を継続する（S3，S10）。また、S2においてエンジン1が停止している場合はバッテリ7の充電量が40％以上あるかどうかを判定し（S4）、40％以上ある場合は充電の必要なしとして運転の停止状態を継続し（S9）、40％に満たな

い場合は充電の必要があるとしてエンジン１を始動する（Ｓ１０）。

【００１９】一方、Ｓ１において水温が９５℃以上の場合は、さらに１１０℃以上であるかどうかを判定し（Ｓ５）、１１０℃以上の場合にはエンジン１の運転を停止する（Ｓ９）。

【００２０】１１０℃に満たない場合は、エンジン１が運転中であれば（Ｓ２）、Ｓ４と同様の判定をＳ７において行い、エンジン１の運転を停止（Ｓ９）または継続（Ｓ１０）する。また、Ｓ２においてエンジン１が停止している場合は、バッテリ７の充電量が２０％以上あるかどうかを判定し（Ｓ８）、２０％以上ある場合はエンジン１を始動せず（Ｓ９）、２０％に満たない場合のみエンジン１を始動する（Ｓ１０）。

【００２１】このような制御の結果、エンジン１の運転は水温９５℃と１１０℃を境界として、図３に示すような３種類のパターンを示す。すなわち、水温が９５℃以下では充電量の低下に応じて比較的頻繁に運転されるが、水温が９５℃以上になると充電量が大きく低下した場合に限って運転され、水温が１１０℃以上になると、充電量に関係なくエンジン１の運転は行われない。

【００２２】このように、ラジエータ３の水温に応じてエンジン１の運転を制御するので、走行風を冷却に利用できない停車中など冷却条件が悪い場合でもエンジン１がオーバーヒートすることはない。

【００２３】なお、上記実施例においては、水温に基づきエンジン１の運転を制御しているが、水温に基づき発電機２の運転を制御することも可能である。

【００２４】この場合には、発電機２を図４に示すように構成する。この図において２１～２３は電機子コイル、２４は界磁コイル、２５は整流装置、２６はパワートランジスタ、２７はコンパレータである。２８は出力電圧設定装置で、水温検出器５の出力に応じて発電電圧の目標値を出力する。この目標値は図５に示すように設定され、水温が９５℃から１１０℃の間で発電電圧が低下する。この結果、発電出力はこの範囲で１０ｋＷから



０ｋＷまで変化し、出力低下に応じてエンジン１の負荷を軽減する。

【００２５】図６はさらに別の実施例を示し、ここでは発電機２の出力電圧をパワートランジスタ１２で変えるように構成するとともに、水温検出器５の検出水温に応じて制御回路１１がパワートランジスタ１２を制御し、図４と５の実施例と同様に水温上昇に応じて発電出力を低下させる。

【００２６】なお、上記の各実施例はいずれも水冷エンジンの冷却水温に基づきエンジンまたは発電機を制御しているが、空冷エンジンの場合にはブロック壁温センサなどを用いて同様の制御を行えば良い。

【００２７】

【発明の効果】以上のように本発明は、エンジン温度が所定値以上に上昇するとエンジンを停止するかあるいはエンジンの負荷を軽減するようにしたので、停車状態など走行風を利用できない不利な冷却条件においてエンジンがオーバーヒートする不都合を防止することができる。

【図面の簡単な説明】

【図１】本発明の実施例を示すハイブリット車の動力装置のブロック図である。

【図２】エンジン制御装置による制御動作を説明するフローチャートである。

【図３】水温とエンジンの運転状態との関係を示すグラフである。

【図４】本発明の別の実施例を示す発電機制御装置を回路図である。

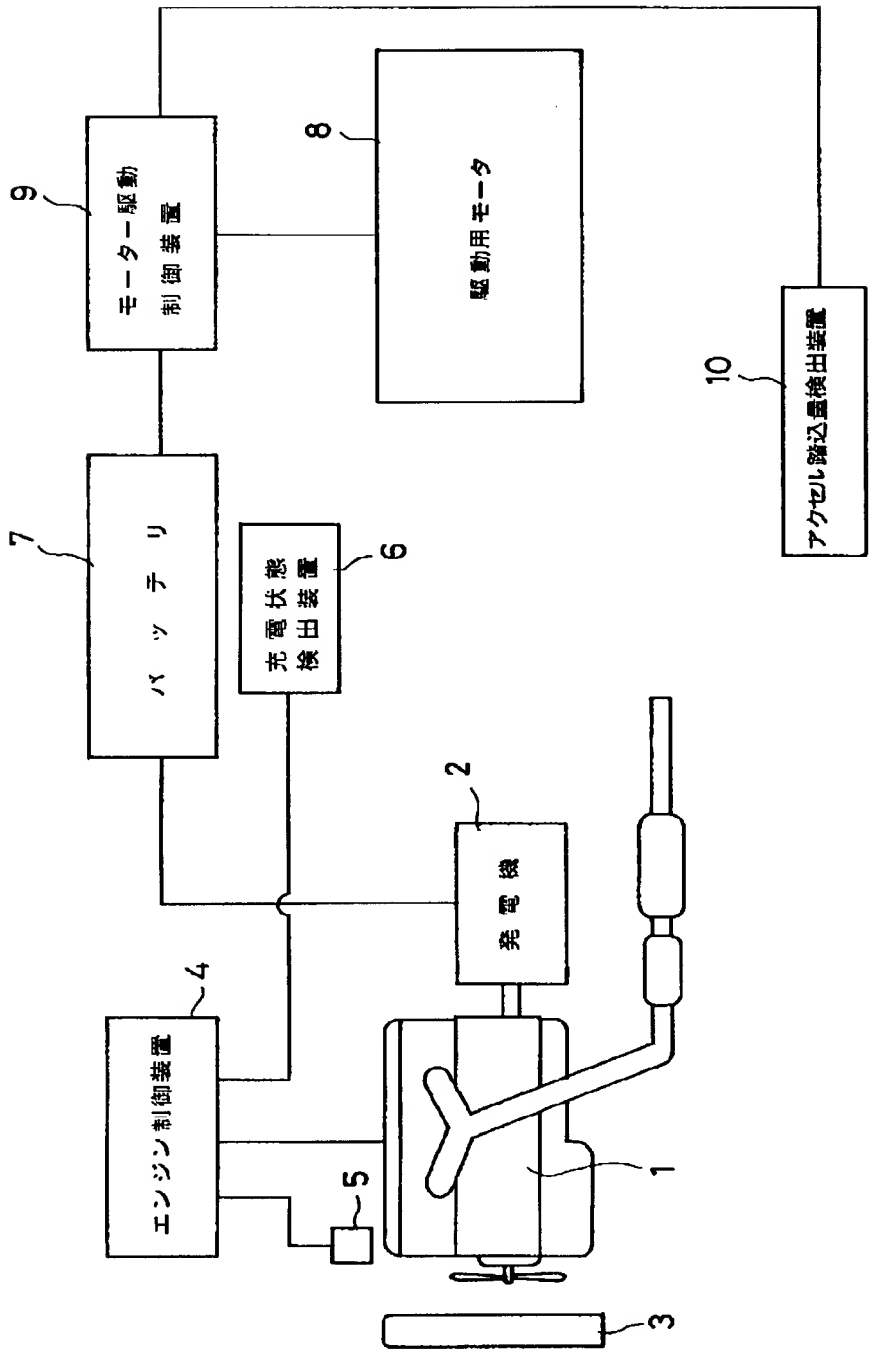
【図５】水温と発電機出力の関係を示すグラフである。

【図６】本発明のさらに別の実施例を示すハイブリット車の動力装置のブロック図である。

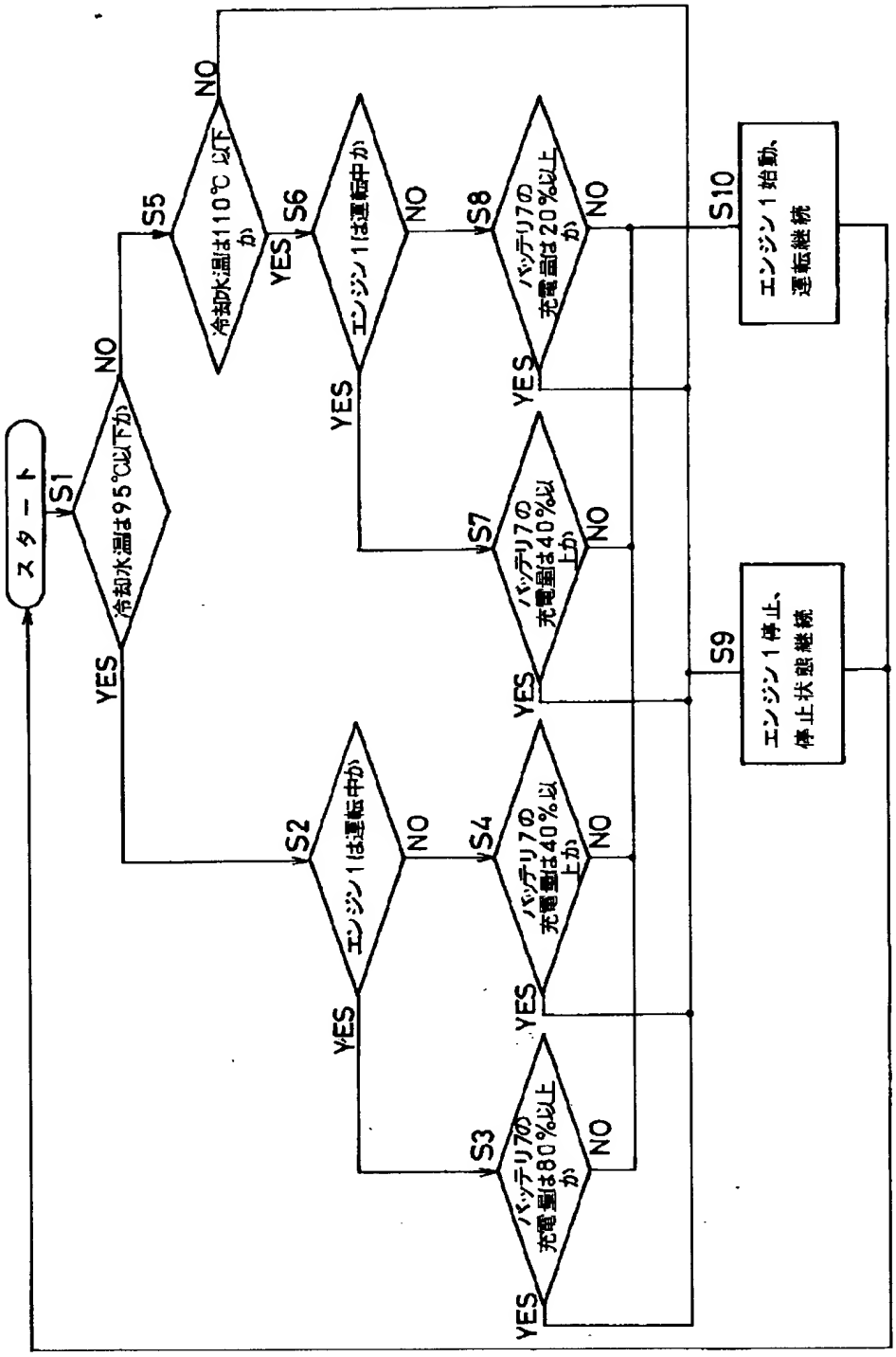
【符号の説明】

１　エンジン
２　発電機
４　エンジン制御装置
５　水温検出器

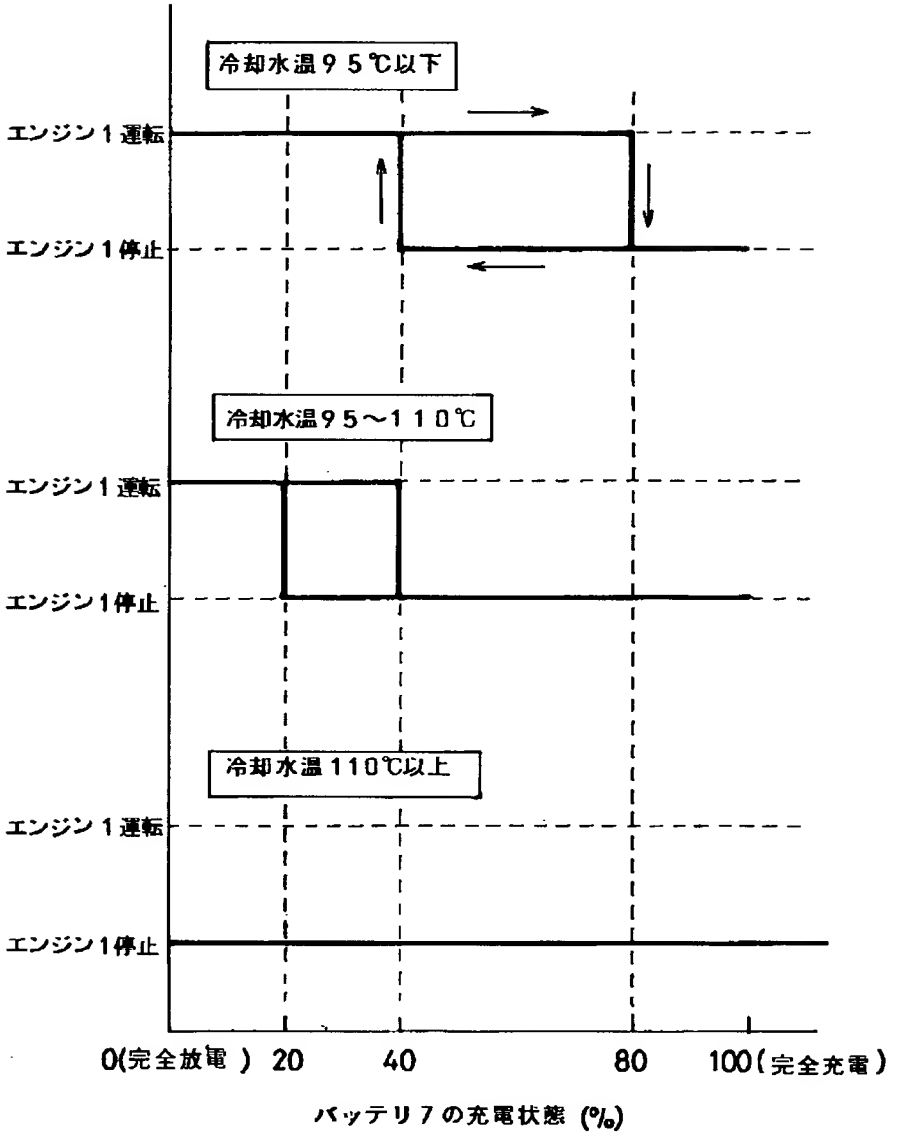
【図1】


モーター駆動
制御装置
9
駆動用モータ
8
アクセル踏込量検出装置
10
バッテリ
7
充電状態
検出装置
6
発電機
2
エンジン制御装置
4
5
1
3

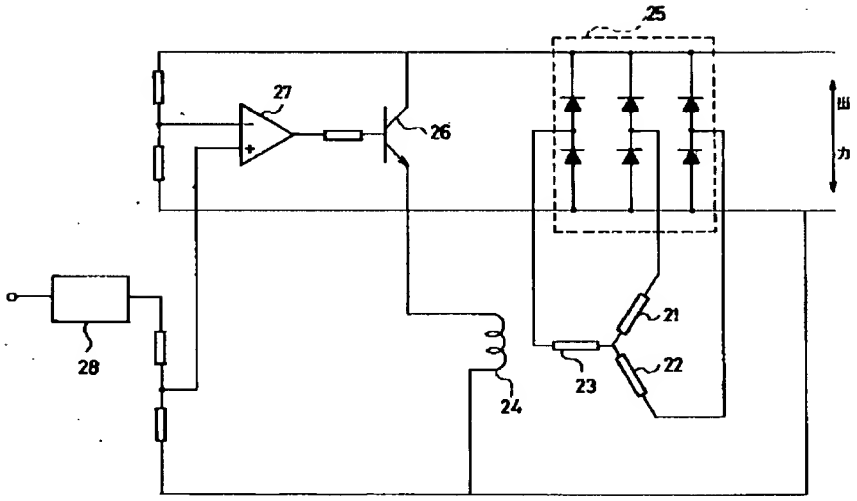
【図2】


スタート
S1
冷却水温は95℃以下か
NO
YES
S2
エンジン1は運転中か
NO
YES
S3
バッテリ7の充電量は80%以上か
NO
YES
S4
バッテリ7の充電量は40%以上か
NO
YES
S5
冷却水温は110℃以下か
NO
YES
S6
エンジン1は運転中か
NO
YES
S7
バッテリ7の充電量は40%以上か
NO
YES
S8
バッテリ7の充電量は20%以上か
NO
YES
S9
エンジン1停止、停止状態継続
S10
エンジン1始動、運転継続

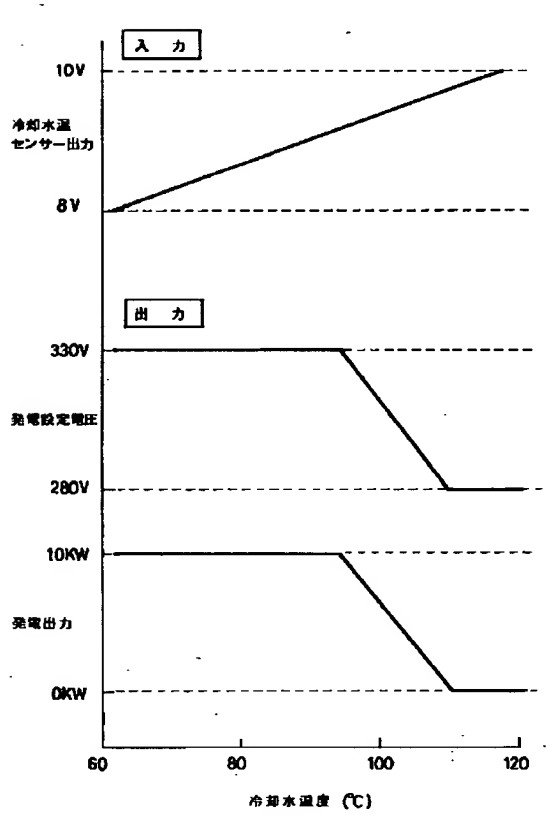
【図3】


冷却水温９５℃以下
エンジン１運転
エンジン１停止
冷却水温９５～１１０℃
エンジン１運転
エンジン１停止
冷却水温１１０℃以上
エンジン１運転
エンジン１停止
0(完全放電)
20
40
80
100(完全充電)
バッテリ７の充電状態 (%)

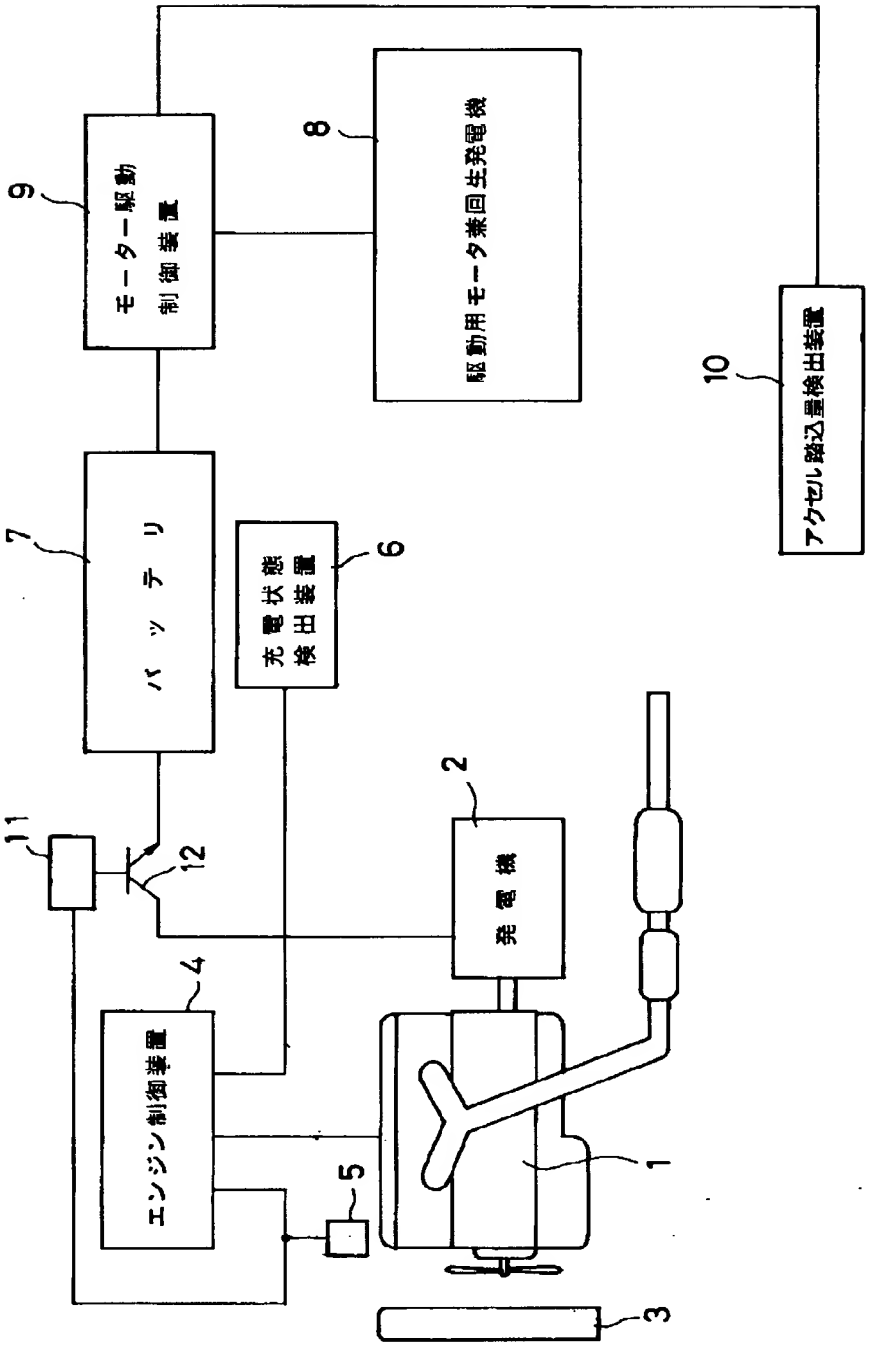
【図4】


25
27
26
出力
28
24
21
22
23

【図5】


入　力
10V
冷却水温
センサー出力
8V
出　力
330V
発電設定電圧
280V
10KW
発電出力
0KW
60
80
100
120
冷却水温度（℃）

【図6】

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**ISHII MITSUNORI**
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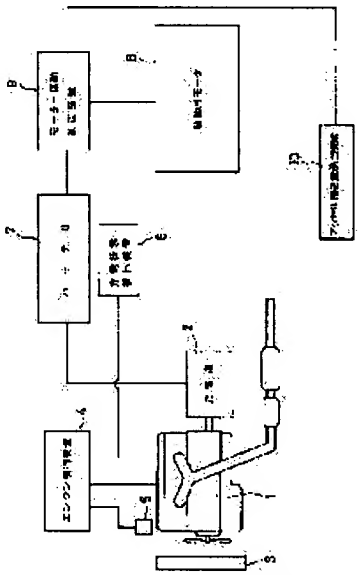
## (54) HYBRID AUTOMOBILE

(57)Abstract:
PURPOSE: To prevent the overheating of an engine under a disadvantageous cooling condition where travel air cannot be utilized by providing a means for stopping the engine or reducing the load of the engine when the temperature detected by a temperature state detecting means has risen exceeding the specified value.
CONSTITUTION: An engine 1 in operation is operated at a fixed speed by a governor, and an engine control device 4 controls the start and stop of the engine 1 according to the water temperature detected by a water temperature detector 5 and the charged state of a battery 7 detected by a charged state detecting device 6. The engine 1 is started when the water temperature is 95°C or lower and the charged quantity is lowered to about 40% or less of the full- charged quantity, for instance, and the operation of the engine 1 is stopped when the charged quantity exceeds about 80%. In the case of the water temperature being approximately 95°C to 110°C, the engine 1 is started when the charged quantity is lowered to about 20% or less, and the operation of the engine 1 is stopped when the charged quantity exceeds about 40%. In the case of the water temperature being about 110°C or higher, the engine 1 is not operated.



LEGAL STATUS

[Date of request for examination] 26.12.1996
[Date of sending the examiner's decision of rejection] 09.12.1997
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

* NOTICES *



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2. **** shows the word which can not be translated.
3.In the drawings, any words are not translated.

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CLAIMS

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[Claim(s)]
[Claim 1] The hybrid car equipped with the structure of driving a generator by operation of this engine and charging the aforementioned battery while having the motor and engine which are characterized by providing the following and which are driven on the current supplied from a battery as a source of run power. A means to detect the temperature state of an engine. The means BURIDDO automobile which suspends an engine or mitigates the load of an engine when the temperature which the temperature state detection means detected rises exceeding a predetermined value.

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[Translation done.]

## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the power-control means of the hybrid car equipped with the motor and the engine as a source of run power.
[0002]
[Description of the Prior Art] From reduction of injurious ingredients, such as NOx contained in the exhaust gas of an automobile, or a viewpoint of energy saving This from which the hybrid car which uses a motor and an engine together in the source of run power attracts attention in recent years When exceeding the output which needs an engine output for a run, while driving a generator with an excess power and charging a battery When an engine output is insufficient to outputs demanded, such as etc., at the time of acceleration, a motor is operated with the power of a battery, and shortage of an engine output is compensated with the output (automotive engineering complete-works 8 "electric vehicle and new style prime-mover" P69-72, October 15, Showa 55 Sankai-Do issue).
[0003]
[Problem(s) to be Solved by the Invention] In such a hybrid car, it is constituted so that an engine may perform rated operation also during a stop for charge. However, since the engine twisted in the style of a run was not able to be cooled, depending on the service condition of an engine, there was a problem that an engine tends to overheat during a stop.
[0004] this invention was made that the above-mentioned trouble should be solved, and aims at equipping a hybrid car with the prevention function of overheat.
[0005]
[Means for Achieving the Goal] While this invention is equipped with the motor and engine which are driven on the current supplied from a battery as a source of run power In the hybrid car equipped with the structure of driving a generator by operation of this engine and charging the aforementioned battery It has a means to detect the temperature state of an engine, and a means to suspend an engine or to mitigate the load of an engine when the temperature which the temperature state detection means detected rises exceeding a predetermined value.
[0006]
[Function] If temperature rises exceeding a predetermined value, it will prevent that an engine will be in an overheat state by stopping operation of an engine, or stopping power generation of a generator, and mitigating the load of an engine.
[0007]
[Example] The example of this invention is shown in drawing 1 - drawing 6 .
[0008] Drawing 1 shows the composition of the power mechanism of a hybrid car, and 1 is a water cooling type engine operated under the cooling-fluid-flow system equipped with the radiator 3. A generator 2 combines with an engine 1 and a battery 7 is connected to this generator 2.
[0009] Operation of an engine 1 is controlled by the engine control system 4. The charge state detector 6 which the water temperature detector 5 which detects the water temperature of a radiator 3 as a temperature state detection means is connected to this engine control system 4, and detects the charge state of a battery 7 is connected. The water temperature detector 5 consists of thermistors, and the charge state detector 6 consists of aerometers of the battery liquid with which the battery 7 was filled up.
[0010] The engine 1 on stream is operated by fixed rotation by the centrifugal spark advancer which is not illustrated, and an engine control system 4 controls starting and a halt of an engine 1 according to the charge state of the water temperature which the water temperature detector 5 detects, and the battery 7 which charge state detection equipment 6 detects.
[0011] That is, if water temperature is 95 degrees C or less, for example, and an engine 1 is put into operation when a charge falls for example, to 40% or less of a full charge, and a charge exceeds 80%, operation of an engine 1 will be stopped.
[0012] If an engine 1 is put into operation and it exceeds 40% when water temperature is 95 degrees C or more 110 degrees C or less, and a charge falls to 20% or less, operation of an engine 1 will be stopped.
[0013] Moreover, water temperature does not operate an engine 1 above 110 degrees C.
[0014] On the other hand, the output current of a battery 7 is supplied to a motor 8 through motor control equipment 9. The amount detection mechanism 10 of accelerator treading in is connected to motor control equipment 9, and motor control equipment 9 will operate a motor 8, if the amount of accelerator treading in which the amount detection mechanism 10 of accelerator treading in detected reaches more than fixed.

[0015] In addition, it combines with a wheel through the reducer which is not illustrated, and a motor 8 collaborates with an engine 1, and carries out the rotation drive of the wheel.
[0016] Next, an operation is explained.
[0017] Control of the engine 1 by the engine control system 4 is performed according to the flow chart shown in drawing 2 .
[0018] That is, it judges first whether water temperature is 95 degrees C or less from the output of the water temperature detector 5 (S1), if an engine 1 is on stream in the case of 95 degrees C or less (S2), when the charge of a battery 7 is 80% or more, operation of an engine 1 stops (S3, S9), and when not filling a charge to 80%, operation of an engine 1 is continued (S3, S10). Moreover, an engine 1 is put into operation noting that there is the need for charge, when judging whether there is 40% or more of charges of a battery 7 when the engine 1 has stopped in S2, continuing (S4) and the idle state of operation as having no need for charge 40% or more in a certain case and not filling to (S9) and 40% (S10).
[0019] On the other hand, when water temperature is 95 degrees C or more in S1, it judges whether it is 110 more degrees C or more (S5), and, in the case of 110 degrees C or more, operation of an engine 1 is stopped (S9).
[0020] if the engine 1 is on stream when not fulfilling 110 degrees C (S2) -- the same judgment as S4 -- S7 -- setting -- carrying out -- operation of an engine 1 -- a halt (S9) -- or it continues (S10) Moreover, it judges whether when the engine 1 has stopped in S2, there is 20% or more of charges of a battery 7 (S8), and 20% or more, in a certain case, only when not putting an engine 1 into operation and not filling to (S9) and 20%, an engine 1 is put into operation (S10).
[0021] Operation of an engine 1 shows three kinds of patterns as shown in drawing 3 the water temperature of 95 degrees C, and bordering on 110 degrees C as a result of such control. That is, although water temperature is operated comparatively frequently according to the fall of a charge below 95 degrees C, if it will be operated only within the case where a charge falls greatly if water temperature becomes 95 degrees C or more, and water temperature becomes 110 degrees C or more, operation of an engine 1 will not be performed regardless of a charge.
[0022] Thus, since operation of an engine 1 is controlled according to the water temperature of a radiator 3, even when cooling conditions, such as under the stop which cannot use a run wind for cooling, are bad, an engine 1 does not overheat.
[0023] In addition, in the above-mentioned example, although operation of an engine 1 is controlled based on water temperature, it is also possible to control operation of a generator 2 based on water temperature.
[0024] In this case, a generator 2 is constituted as shown in drawing 4 . For an armature coil and 24, as for a rectifier and 26, in this drawing, a field coil and 25 are [ 21-23 / a power transistor and 27 ] comparators. 28 is an output voltage setting device and outputs the desired value of power generation voltage according to the output of the water temperature detector 5. This desired value is set up as shown in drawing 5 , and water temperature falls [ power generation voltage ] between 95 degrees C and 110 degrees C. Consequently, a power generation output changes from 10kW to 0kW in this range, and mitigates the load of an engine 1 according to loss of power.
[0025] Drawing 6 shows still more nearly another example, and according to the detection water temperature of the water temperature detector 5, a control circuit 11 controls a power transistor 12, and it reduces a power generation output according to a water temperature rise like drawing 4 and the example of 5 while constituting so that the output voltage of a generator 2 may be changed with a power transistor 12 here.
[0026] In addition, what is necessary is just to perform same control using a block wall-temperature sensor etc. in the case of an air cooled engine, although each above-mentioned example is all controlling the engine or the generator based on the cooling water temperature of a water cooled engine.
[0027]
[Effect of the Invention] As mentioned above, since this invention suspends an engine or mitigated the load of an engine when engine temperature rose beyond the predetermined value, it can prevent un-arranging [ for which an engine overheats in the disadvantageous cooling conditions which cannot use run winds, such as a stop state, ].

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[Translation done.]

* NOTICES *



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3.In the drawings, any words are not translated.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]
[Drawing 1] It is the block diagram of the power plant of a high Brit vehicle in which the example of this invention is shown.
[Drawing 2] It is a flow chart explaining the control action by the engine control system.
[Drawing 3] It is the graph which shows the relation between water temperature and the operational status of an engine.
[Drawing 4] It is a circuit diagram about the arrangement for controlling electric generator which shows another example of this invention.
[Drawing 5] It is the graph which shows the relation between water temperature and a generator output.
[Drawing 6] It is the block diagram of the power plant of a high Brit vehicle in which still more nearly another example of this invention is shown.
[Description of Notations]
1 Engine
2 Generator
4 Engine Control System
5 Water Temperature Detector

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[Translation done.]

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CLAIMS

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[Claim]
[Claim 1] While it has the motor and engine which are driven on the current supplied from a battery as a source of run power In the hybrid car equipped with the structure of driving a generator by operation of this engine and charging the aforementioned battery The hybrid car characterized by having a means to detect the temperature status of an engine, and a means to suspend an engine or to mitigate the load of an engine when the temperature which the temperature status detection means detected rises exceeding a predetermined value

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[Translation done.]

## DETAILED DESCRIPTION

[Detailed description]
[0001]
[Field of the Invention] this invention relates to the power-control means of the hybrid car equipped with the motor and the engine as a source of run power.
[0002]
[Prior art] From the reduction of detrimental components, such as NOx, and the viewpoint of energy saving which are included in the exhaust gas of an automobile This from which the hybrid car which uses a motor and an engine together in the source of run power attracts attention in recent years When exceeding the output which needs an engine output for a run, while a generator is driven with an excess power and a battery is charged When an engine output is insufficient to the outputs demanded, such as etc., at the time of acceleration, a motor is operated with the power of a battery, and shortage of an engine output is compensated with the output (automotive-engineering complete-works 8 "electric vehicle and new style prime-mover" P 69-72, October 15, Showa 55 ****** issue).
[0003]
[The technical probrem of invention] In such a hybrid car, it is constituted so that an engine may perform a rated operation also during stoppage for charge. However, since the engine twisted in the style of a run was not able to be cooled, there was a problem that an engine tends to overheat by some service condition of an engine during stoppage.
[0004] this invention was made that the above-mentioned trouble should be solved, and aims at equipping a hybrid car with the prevention function of overheat.
[0005]
[The means for attaining a technical probrem] While this invention is equipped with the motor and engine which are driven on the current supplied from a battery as a source of run power In the hybrid car equipped with the structure of driving a generator by operation of this engine and charging the aforementioned battery It has a means to detect the temperature status of an engine, and a means to suspend an engine or to mitigate the load of an engine when the temperature which the temperature status detection means detected rises exceeding a predetermined value.
[0006]
[Operation] If temperature rises exceeding a predetermined value, it will prevent that an engine will be in the overheat status by stopping operation of an engine, or stopping power generation of a generator, and mitigating the load of an engine.
[0007]
[Example] The example of this invention is shown in drawing 1 - drawing 6 .
[0008] Drawing 1 shows the configuration of the power device of a hybrid car, and 1 is a water-cooling-type engine operated under the cooling-fluid-flow system equipped with the radiator 3. A generator 2 combines with an engine 1 and a battery 7 is connected to this generator 2.
[0009] Operation of an engine 1 is controlled by the engine control system 4. The charge status detector 6 which the water temperature detector 5 which detects the water temperature of a radiator 3 as a temperature status detection means is connected to this engine control system 4, and detects the charge status of a battery 7 is connected. The water temperature detector 5 consists of a thermistor, and the charge status detector 6 consists of an aerometer of the battery liquid with which the battery 7 was filled up.
[0010] The engine 1 on stream is operated by fixed rotation by the centrifugal spark advancer which is not illustrated, and an engine control system 4 controls starting and a halt of an engine 1 according to the charge status of the water temperature which the water temperature detector 5 detects, and the battery 7 which the charge status detection equipment 6 detects.
[0011] That is, if water temperature is 95 degrees C or less, for example, and an engine 1 is put into operation when a charge falls for example, to 40% or less of a full charge, and a charge exceeds 80%, operation of an engine 1 will be stopped.
[0012] If an engine 1 is put into operation and it exceeds 40% when a charge falls to 20% or less when water temperature is 95 degrees C or more 110 degrees C or less, operation of an engine 1 will be stopped.
[0013] Moreover, water temperature does not operate an engine 1 above 110 degrees C.
[0014] On the other hand, the output current of a battery 7 is supplied to a motor 8 through the motor control equipment 9. The amount detection device 10 of accelerator treading in is connected to the motor control equipment 9, and the motor control equipment 9 will operate a motor 8, if the amount of accelerator treading in which the amount detection device 10 of accelerator treading in detected reaches more than fixed.

[0015] In addition, it combines with a wheel through the reducer which is not illustrated, and a motor 8 collaborates with an engine 1, and carries out the rotation drive of the wheel.
[0016] Next, an operation is explained.
[0017] A control of the engine 1 by the engine control system 4 is performed according to the flow chart shown in drawing 2 .
[0018] That is, it judges first whether water temperature is 95 degrees C or less from the output of the water temperature detector 5 (S1), if the engine 1 is on stream in 95 degrees C or less (S2), when the charge of a battery 7 is 80% or more, operation of an engine 1 stops (S3, S9), and when not filling a charge to 80%, operation of an engine 1 is continued (S3, S10). Moreover, it judges whether when the engine 1 has stopped in S2, there is 40% or more of charges of a battery 7, and an engine 1 is put into operation noting that there is the need for charge, when the idle state of (S4) and operation as having no need for charge 40% or more in a certain case is continued and it does not fill to (S9) and 40% (S10).
[0019] On the other hand, in S1, when water temperature is 95 degrees C or more, it judges whether it is 110 more degrees C or more (S5), and, in 110 degrees C or more, operation of an engine 1 is stopped (S9).
[0020] if the engine 1 is on stream when not fulfilling 110 degrees C (S2) -- the same judgment as S4 -- S7 -- setting -- carrying out -- operation of an engine 1 -- a halt (S9) -- or it continues (S10) Moreover, it judges whether when the engine 1 has stopped in S2, there is 20% or more of charges of a battery 7 (S8), and 20% or more, in a certain case, only when an engine 1 is not put into operation and it does not fill to (S9) and 20%, an engine 1 is put into operation (S10).
[0021] Operation of an engine 1 shows three kinds of patterns which are shown in drawing 3 the water temperature of 95 degrees C, and bordering on 110 degrees C as a result of such a control. That is, although water temperature is operated comparatively frequently below 95 degrees C according to a fall of a charge, if it will be operated only within the case where a charge falls greatly if water temperature becomes 95 degrees C or more and water temperature becomes 110 degrees C or more, operation of an engine 1 will not be performed regardless of a charge.
[0022] Thus, since operation of an engine 1 is controlled according to the water temperature of a radiator 3, even when cooling conditions, such as under the stoppage which cannot use a run wind for cooling, are bad, an engine 1 does not overheat.
[0023] In addition, in the above-mentioned example, although operation of an engine 1 is controlled based on water temperature, it is also possible to control operation of a generator 2 based on water temperature.
[0024] In this case, a generator 2 is constituted as shown in drawing 4 . For an armature coil and 24, as for a rectifier and 26, in this drawing, a field coil and 25 are [ 21-23 / a power transistor and 27 ] comparators. 28 is an output voltage setting device and outputs the desired value of a power generation voltage according to the output of the water temperature detector 5. This desired value is set up as shown in drawing 5 , and water temperature falls [ a power generation voltage ] between 95 degrees C and 110 degrees C. Consequently, a power generation output changes from 10kW to 0kW in this domain, and mitigates the load of an engine 1 according to loss of power.
[0025] Drawing 6 shows still another example, and according to the detection water temperature of the water temperature detector 5, a control circuit 11 controls a power transistor 12, and it reduces a power generation output like drawing 4 and the example of 5 according to water temperature elevation while it constitutes so that the output voltage of a generator 2 may be changed by the power transistor 12 here.
[0026] In addition, what is necessary is just to perform the same control using a block wall-temperature sensor etc. in the case of an air cooled engine, although each above-mentioned example is all controlling the engine or the generator based on the cooling water temperature of a water cooled engine.
[0027]
[Effect of the invention] As mentioned above, since this invention suspends an engine or mitigated the load of an engine when engine temperature rose beyond the predetermined value, it can prevent un-arranging [ for which an engine overheats in the disadvantageous cooling conditions which cannot use run winds, such as the stoppage status, ].

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[Translation done.]

* NOTICES *



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DESCRIPTION OF DRAWINGS

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[An easy explanation of a drawing]
[ Drawing 1 ] It is the block diagram of the power plant of a high Brit vehicle showing the example of this invention.
[ Drawing 2 ] It is a flow chart explaining the control action by the engine control system.
[ Drawing 3 ] It is the graph which shows the relation between water temperature and the operational status of an engine.
[ Drawing 4 ] It is a circuit diagram about the generator control unit in which another example of this invention is shown.
[ Drawing 5 ] It is the graph which shows the relation between water temperature and a generator output.
[ Drawing 6 ] It is the block diagram of the power plant of a high Brit vehicle showing still another example of this invention.
[An explanation of a sign]
1 Engine
2 Generator
4 Engine Control System
5 Water Temperature Detector

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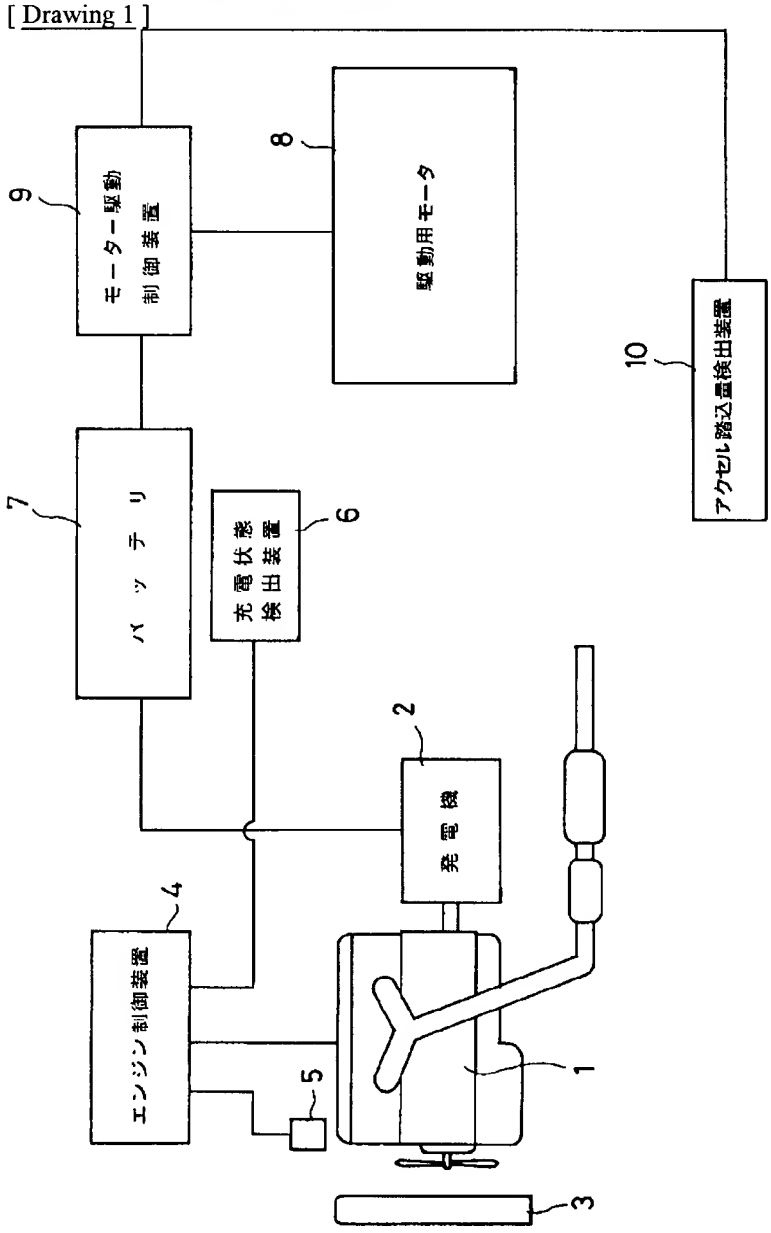
[Translation done.]

* NOTICES *

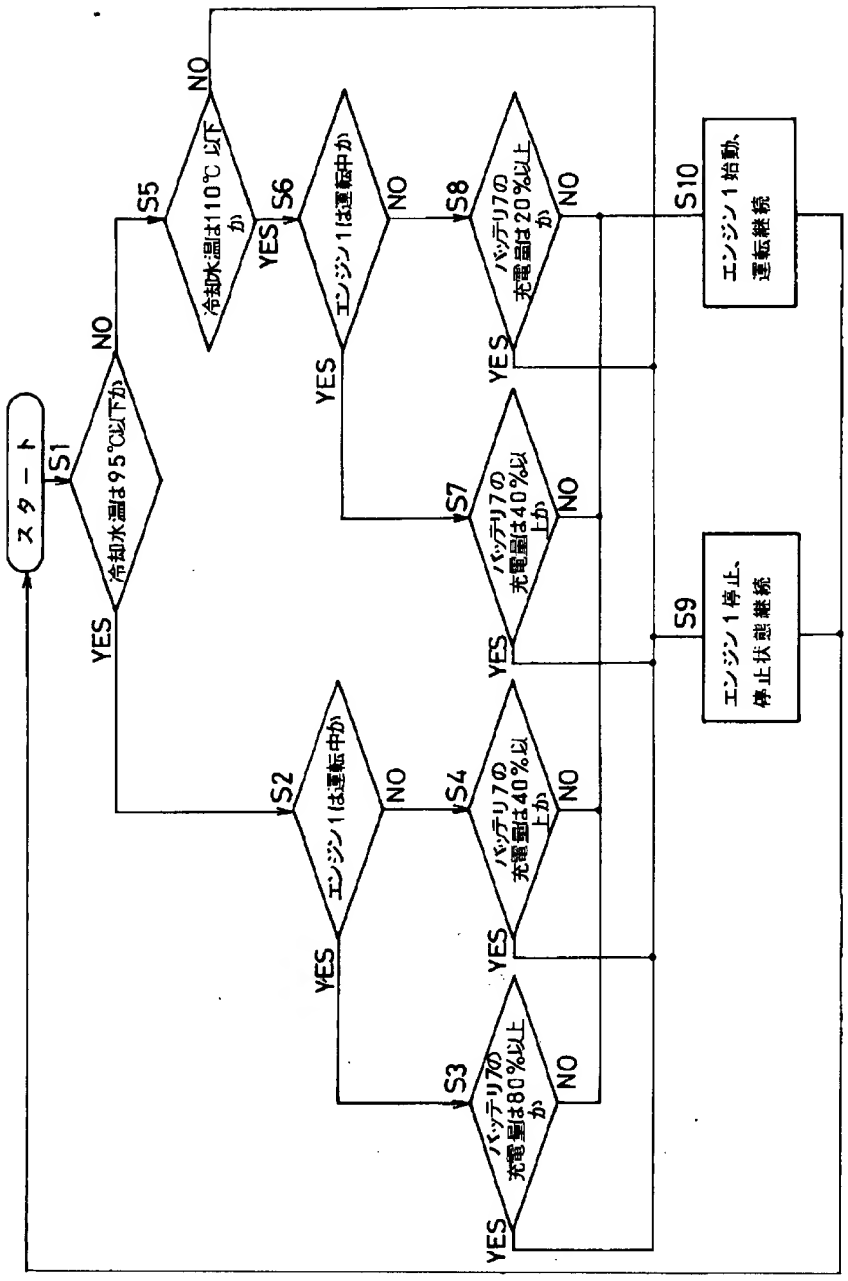


DRAWINGS

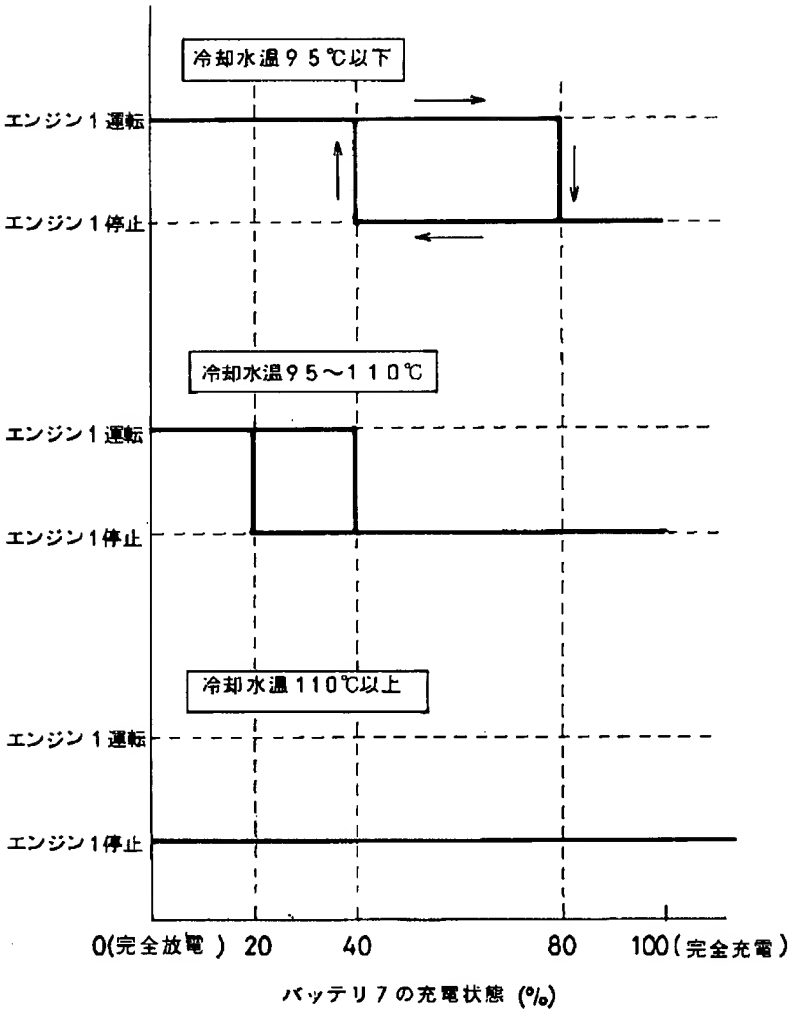
[ Drawing 1 ]



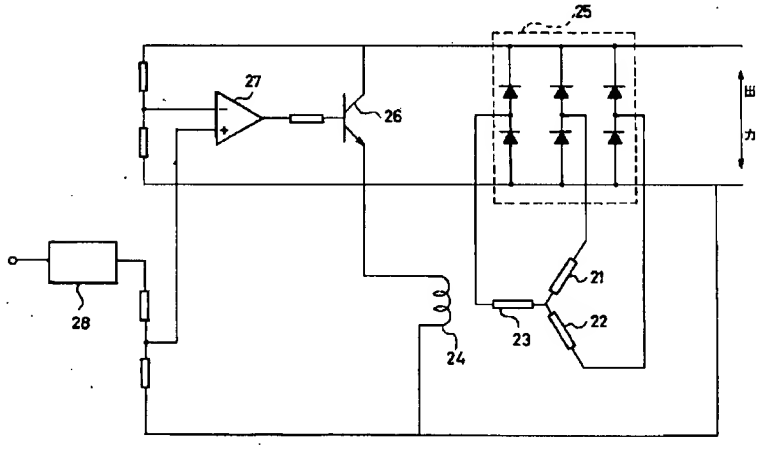

[ Drawing 2 ]


スタート
S1
冷却水温は95℃以下か
NO
YES
S2
エンジン1は運転中か
NO
YES
S3
バッテリ7の充電量は80%以上か
NO
YES
S4
バッテリ7の充電量は40%以上か
NO
YES
S5
冷却水温は110℃以下か
NO
YES
S6
エンジン1は運転中か
NO
YES
S7
バッテリ7の充電量は40%以上か
NO
YES
S8
バッテリ7の充電量は20%以上か
NO
YES
S9
エンジン1停止、停止状態継続
S10
エンジン1始動、運転継続

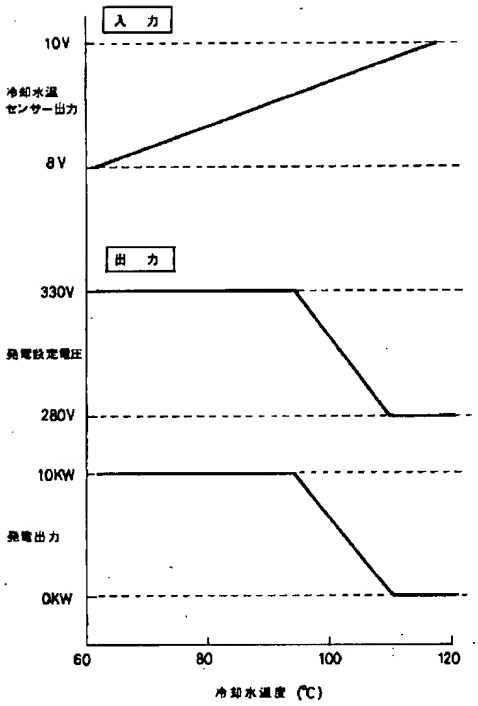
[ Drawing 3 ]



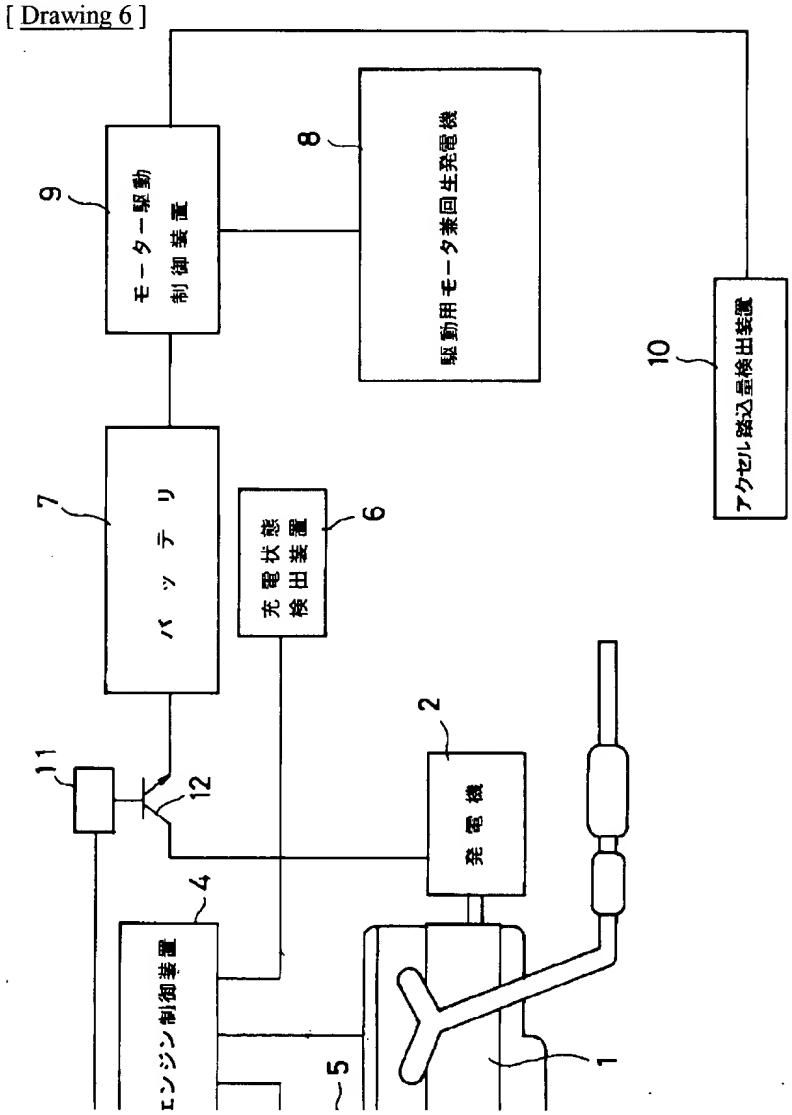

[ Drawing 4 ]




[ Drawing 5 ]


入 力
10V
冷却水温
センサー出力
8V
出 力
330V
発電設定電圧
280V
10KW
発電出力
0KW
60
80
100
120
冷却水温度 (℃)

[ Drawing 6 ]


9
モーター駆動
制御装置
8
駆動用モータ兼回生発電機
10
アクセル踏込量検出装置
7
バッテリ
6
充電状態
検出装置
2
発電機
11
12
4
エンジン制御装置
5
1

PCL XL error

Subsystem: KERNEL

Error: IllegalOperatorSequence

Operator: SetClipToPage

Position: 1033